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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/612,260	07/07/2000	Guy M. Cohen	YOR9-2000-0174	7116

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EXAMINER

KANG, DONGHEE

ART UNIT PAPER NUMBER

2811

DATE MAILED: 04/22/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/612,260

Applicant(s)

COHEN ET AL.

Examiner

Donghee Kang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 March 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-43 is/are pending in the application.
- 4a) Of the above claim(s) 21-43 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Remarks

1. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

3. Claims **1, 4, 7, 8 & 10** are rejected under 35 U.S.C. 102(e) as being anticipated by Kumagai (US 6,188,111).

Kumagai discloses a transistor comprising (Fig.15):

a channel region (142); a first gate (145) on top of said channel region; first gate dielectric (154) below said first gate; a second gate (140) below said channel region, wherein said first gate comprises a different thickness than said second gate; second gate dielectric (153) above said second gate, wherein said first gate dielectric comprises a different thickness than said second gate dielectric; and an isolation layer (150) below said second gate, wherein said first gate are electrically separated from each other and said first gate, said second gate and said channel region form a planarized structure.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims **2-3, & 9** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kumagai.

Regarding claims **2-3**, Kumagai teaches substantially the entire claimed structure, applied to claim 1 as explained above, except that the first gate comprises a different doping concentration and doping species than said second gate.

It is, however, well known in the art to select the concentration of gate electrode to adjust a threshold voltage in the transistor. If the first gate electrode has a lower concentration than the second gate electrode, a threshold voltage of the first gate is lower than that of the second gate. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have formed Kumagai's "first and second gate" having a different concentration, since the different concentration of gate electrode provides the different threshold voltage in device.

Regarding claim **9**, although Kumagai does not teach the first gate dielectric layer comprise a different material than said second gate dielectric layer, it would have been obvious to one having ordinary skill in the art at the time the invention was made to form the dielectric layer, *having the materials as claimed*, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its

suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

6. Claims **6, 11, 14, 16, & 18-20** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kumagai in view of Pfister (US 5,166,084).

Regarding claim **6**, Kumagai does not teach the first gate electrode comprise a different material than said second gate electrode. However, Pfister teaches in Fig.4 the first gate electrode (24) comprise a different material than said second gate electrode (26). Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the teaching of Pfister with Kumagai's device, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

Regarding claims **11, 14, 16, & 18-20**, Kumagai discloses a transistor comprising (Fig.15):

a channel region (142); a first gate (145) on top of said channel region; first gate dielectric (154) below said first gate; a second gate (140) below said channel region, wherein said first gate comprises a different thickness than said second gate; second gate dielectric (153) above said second gate, wherein said first gate dielectric comprises a different thickness than said second gate dielectric; and an isolation layer (150) below said second gate, wherein said first gate are electrically separated from each other and said first gate, said second gate and said channel region form a planarized structure.

Kumagai does not teach the first gate electrode comprise a different material than said second gate electrode. However, it would have be an obvious for the same reason as given the rejection of claim 6 (see above).

Regarding claims **12-13**, Kumagai teaches substantially the entire claimed structure, applied to claim 11 as explained above, except that the first gate comprises a different doping concentration and doping species than said second gate. It would have be an obvious for the same reason as given rejection of claim 2.

Regarding claim **15**, although Kumagai does not teach the first gate dielectric layer comprise a different material than said second gate dielectric layer, it would have been obvious to one having ordinary skill in the art at the time the invention was made to form the dielectric layer, *having the materials as claimed*, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

7. Claims **5 & 17** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kumagai in view of Uesugi et al. (US 5,708,286).

Kumagai applies to claims 1 & 11 above.

Although Kumagai fails to teach first conductive contact of first gate and second conductive contact of second gate are coplanar, Uesugi et al teaches in Fig.1 & Col.7, lines 42-46 the first conductive contact (80) of first gate (60) and second conductive contact (90) of second gate (30) are coplanar. Therefore, it would have been obvious to

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one of ordinary skill in the art at the time the invention was made to combine the teaching of Uesugi with Kumagai's device in order to reduce a manufacturing processing.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Donghee Kang whose telephone number is 703-305-9147. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 703-308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Donghee Kang, Ph.D.
April 16, 2002

Steven Loke
Primary Examiner

A handwritten signature in black ink, appearing to read "Steven Loke", written in a cursive style.